Appendix D
Description of the Big Cypress Seminole Indian Reservation Demonstration Pilot

APPENDIX D

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Objectives

The goal of this project was to reduce phosphorus concentration in wetlands water to acceptable levels while minimizing mechanical requirements. Phosphorus reduction was designed to occur in two stages, chemical precipitation (chemical treatment/ treatment pond) followed by natural chemical stabilization in the ecosystem (wetlands). A process schematic is shown in the attached Exhibit C-1.

Water Supply and Transmission

After the raw water supply and transmission system has been installed raw water will be pumped from the West Feeder canal at 100 gpm directly to the wetlands test area to hydrate and condition the test area. During this conditioning period, the raw water supply and delivery system will be capable of supplying an additional 50 gpm of raw water to the chemical treatment/treatment pond system for preliminary testing. After the hydration period, raw water flow will be diverted at 100 gpm to the chemical treatment/treatment pond system which will discharge to the wetlands test area.

Chemical Treatment

Chemical treatment is intended as the primary method of phosphorus removal. The purpose of adding aluminum or iron salts to the process is to precipitate and adsorb phosphorus. It is anticipated that the primary chemical to be used for phosphorus removal will be polyaluminum chloride (PACL). An anionic polymer will also be added to increase particulate removal efficiency in the pond.

For chemical addition, electronic diaphragm metering (pulse) pumps will be used. Chemical flow rate will be adjusted manually at the pulse pumps by varying the pulse rate and/or the stroke length. PACL will be fed as neat chemical from the chemical supplier to tote tanks. Extra tote tanks will be stored on the pad to provide a minimum of 30 days storage. Polymer will be made up as a 1% solution using a packaged liquid polymer blending and feed system mounted on a 55 gal polymer drum. Polymer dilution water is available at the site.

All chemical treatment equipment will be placed on a poured concrete pad adjacent to the pond as shown in Exhibit C-2 (Plan And Profile – Pond and Trench Treatment System). The pad will include space for in-line static mixers, chemical pumps, chemical solution tanks, flow indicators, control valves, chemical storage, and flocculation tanks. The chemical pump and chemical storage area will include a containment curb to contain chemical spills. PACL will be supplied in 300 gallon tote tanks by the chemical supplier. Concentrated liquid polymer will be supplied in 55 gallon drums. An access ramp will be provided for chemical delivery. All electrical equipment on the chemical treatment pad will be 120 V single phase

and will have plug-in connections to eliminate hard wiring requirements. A partial rain shelter will cover the electrical equipment.

The chemical treatment system includes two 2000 gallon flocculation tanks with picket-fence type adjustable speed mixers. The flocculation tanks will be downstream of chemical injection and will provide 30 minutes of flocculation time. If required, chemically treated water will be diverted to the flocculation tanks to provide additional flocculation time prior to entering the treatment pond.

Treatment Pond

The treatment pond (pond) shown in Exhibit C-3 (Cross Sectional Profile of Pond Treatment) will be used for solids contact, solids separation, and residual solids storage. The pond area will initially be leveled at an elevation of 9 ft. A 4-foot high berm will be built around the pond and the normal water level will be at 3.5 ft from base. The pond will be lined with 40-mil high density polyethylene (HDPE) geomembrane and has enough solids storage volume for approximately 3 months of operation at which point solids will be removed and trucked for disposal.

Chemically treated water will flow through 2 distribution pipes running along the base of the pond. Each distribution pipe is located in a two-foot deep trench sized to hold about 3 days of precipitated solids. The distribution pipes are equally spaced and have hole patterns to provide uniform water distribution. Once the pipe trenches fill with solids, solids contact will occur with the inlet water. Solids removal occurs as water flows upward through the sludge blanket. A weir box at the far end of the pond will be used to set the water level in the pond and to collect treated water. By using a thicker rubber sheet or two 40-mil HDPE sheets, the concrete slab for the weir box can be placed directly on the geomembrane. The weir box will be blocked at the front and back and will have adjustable weirs on the sides. Treated water will flow over the weirs and out through the discharge pipe at the base of the weir box.

Wetlands Treatment

Treated water flows by gravity from the pond weir box through the discharge pipe to the wetlands application location. The pipe will discharge at a single point. As the water discharges, it will spread out over the wetlands treatment area. A uniform water level in the wetland will be maintained by using an inflatable dike at the far end of the wetlands treatment area.

This design was not implemented due to a decision by the Seminole Tribe not to continue to be a cooperator in this particular project.

Process Schematic Pond treatment system

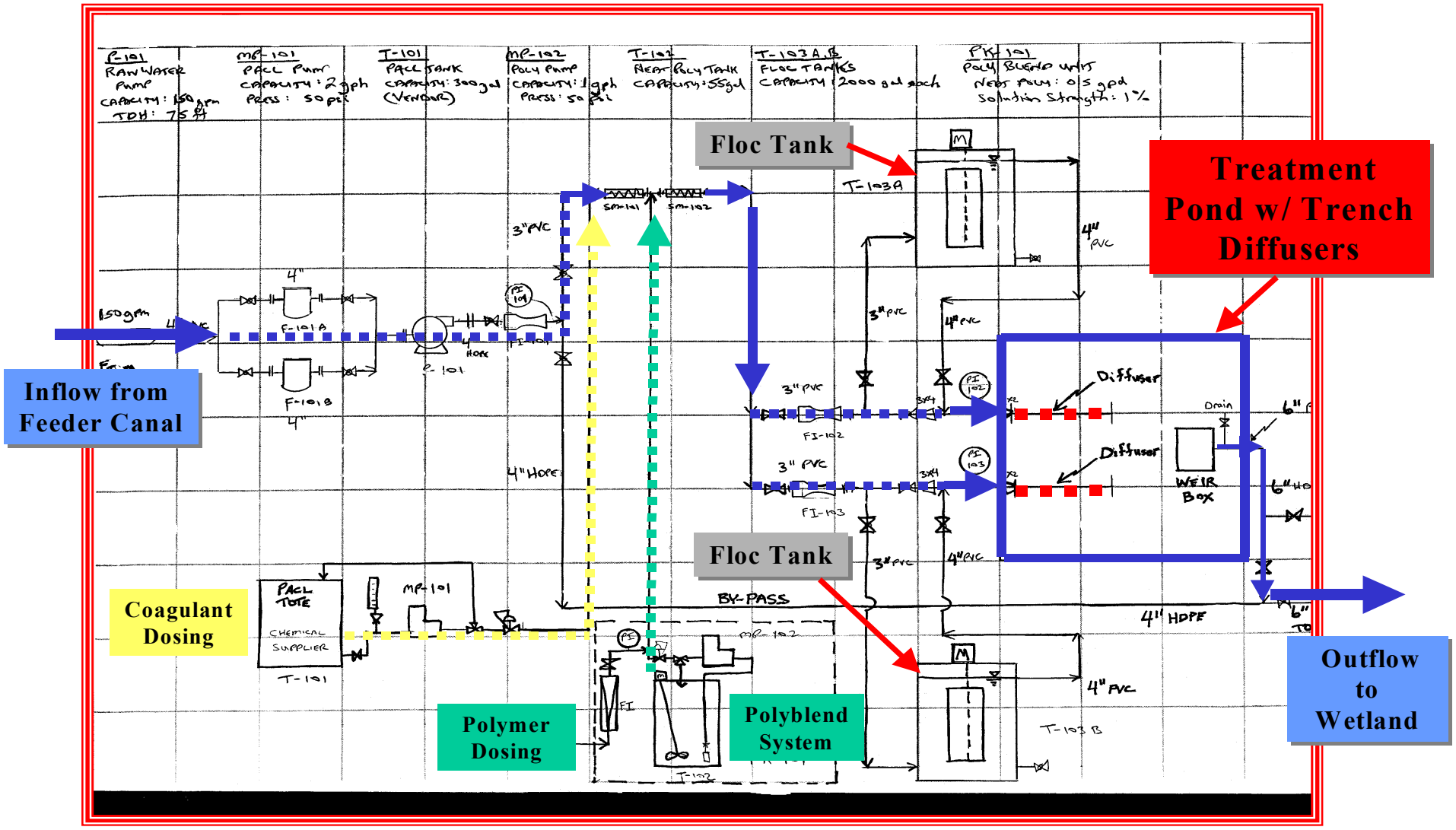

EXHIBIT D-1. Process Schematic fo the Pond Treatment System

Plan and Profile--Pond & Trench Treatment System

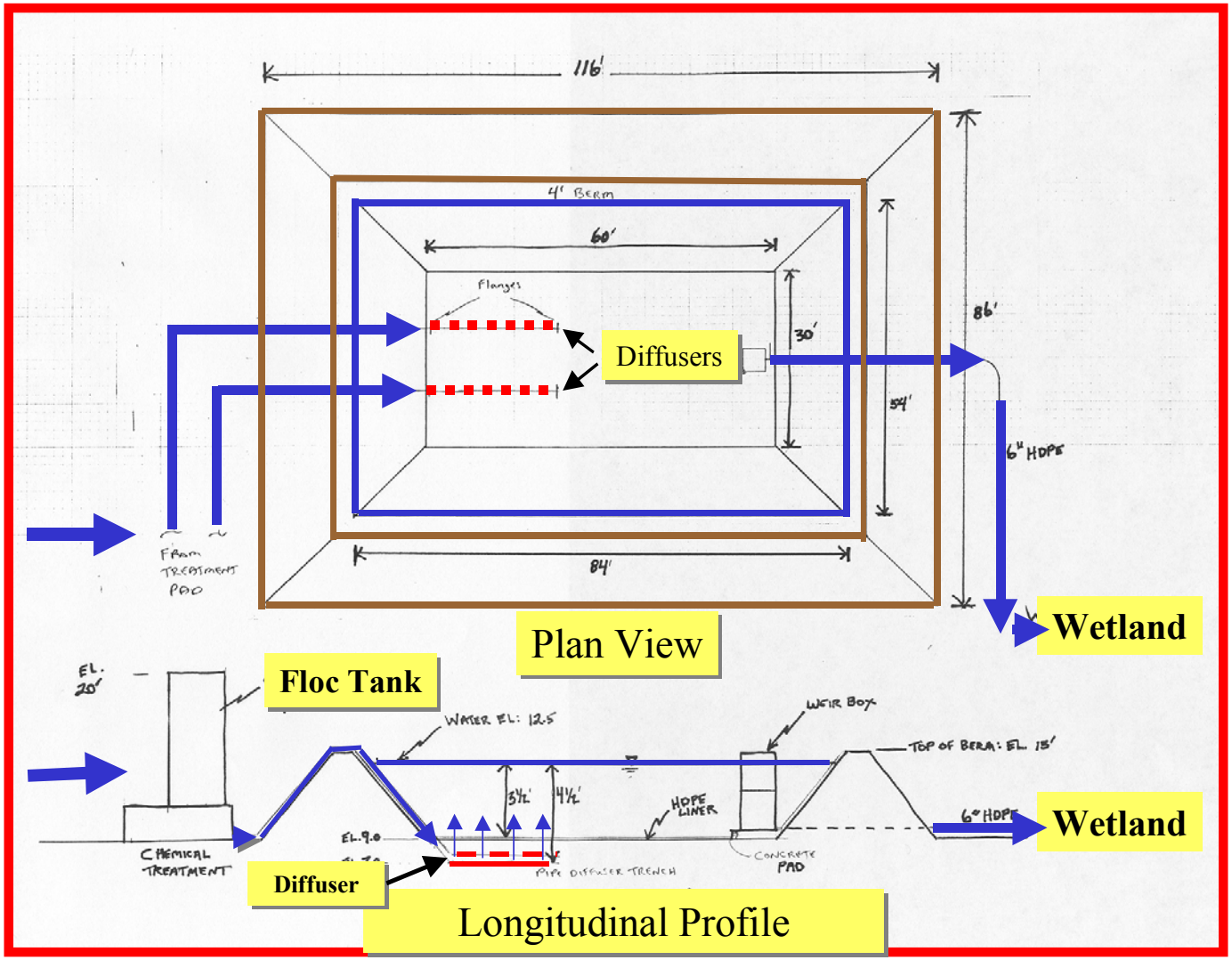

EXHIBIT D-2: Pond and Trench Treatment System. Plan and profile views.

Cross Sectional Profile of Pond Treatment System

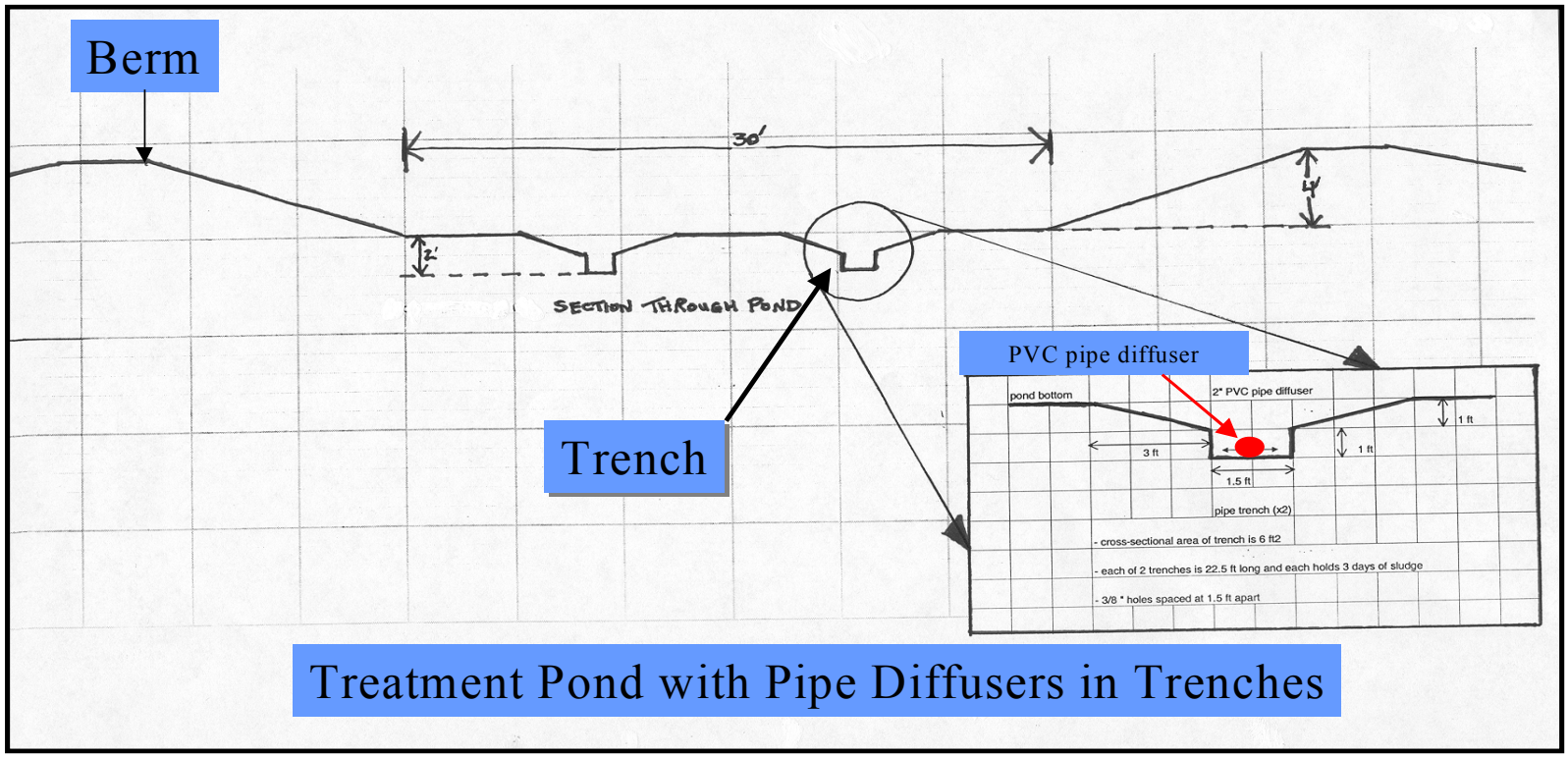

EXHIBIT D-3. Treatment Pond System cross section profile.